RESULTS FROM CSMW TASK 5

(80/20 Coarse-to-Fines Rule of Thumb)

TASK 5 - Research any studies assessing the 80/20 coarse-to-fines "rule-of-thumb" ratio used by various regulatory agencies to determine whether potential source sands are compatible with a given beach. Identify the origin of the rule-of-thumb and nourishment projects where variances from the rule of thumb were allowed, including the basis for each variance.

80/20 COARSE-TO-FINES "RULE-OF-THUMB" RATIO

It appears that there is a widespread misperception, within both regulatory agencies and the regulated community, that an 80/20 coarse-to-fines "rule-of-thumb" ratio is an inviolate rule prohibiting the use of dredged material containing more than 20% fines for beach nourishment purposes. In actuality, the 80/20 ratio is merely a consensus view among regional offices of the U.S. Environmental Protection Agency and the Interagency National Dredging Team of what constitutes "predominantly" sand, for the purpose of applying the testing exclusion criteria of the Marine Protection, Research, and Sanctuaries Act (MPRSA or "Ocean Dumping Act") to the disposition of dredged material (memo from Brian Ross to Laura Johnson, April 2000). Specifics of the exemption are codified in 40 CFR –Part 227, Section 227.13 (b)(1) (U.S. Code of Federal Regulations, 2003a). When the 80/20 ratio is applied under MPRSA, dredged material that is less than 20% silt and finer material (i.e., "composed predominantly of sand") is deemed environmentally acceptable for ocean dumping or beach replenishment without further chemical or toxicity testing. Nonetheless, grain-size analysis of the dredged material must be done to make this determination. The desire to impose an upper limit of fine sediment content is premised on the fact that silts and clays, as opposed to coarser sediments, commonly contain adsorbed chemical contaminants that may have adverse impacts on marine environments or human health.

The U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) share regulatory responsibility for all discharges of dredged material in waters of the United States under Section 404 of the Clean Water Act (CWA), and section 103 of the MPRSA. Officials with both agencies agree that the 80/20 ratio is a "rule of thumb" only and that there is no statutory authority for its enforcement nor any known definitive studies or research from which a 20% cut-off was selected. Instead, it represents a national consensus value based on experience that such sediments are unlikely to be contaminated to an extent that would cause environmental damage (Brian Ross, "Beach Nourishment Questions", e-mail to author, June 7, 2004; Gregory Dombrosky, U.S. Army Corps of Engineers, personal communication, April 9, 2004). More importantly, the MPRSA testing exclusion in no way prohibits the use of material containing more than 20% silt and clay for beach nourishment. To the contrary, both the MPRSA and CWA 404(b)(1) guidelines (40 CFR – Part 230, U.S. Code of Federal

Regulations, 2003b) actually provide the means by which sediments containing a greater percentage of fines can be approved for beach replenishment on a site-specific basis. The EPA and USACE recognize a critical need for beach replenishment and encourage the use of dredged material (which might otherwise be disposed of) for beneficial nourishment projects. Both agencies also recognize that there is significant flexibility in allowing material with higher percentages of fines provided it meets the requirements of the 404(b)(1) guidelines that dredged material be demonstrated to be compatible with the receiving beach (memo from Brian Ross to Laura Johnson, April 2000).

Both the USACE and EPA define dredged material for beach replenishment as "fill" when the basic project purpose is beneficial beach nourishment and the project is determined to be necessary. In this case, regardless of whether the material is specifically dredged from borrow sites or is dredge waste material, it can be regulated under the 404(b)(1) guidelines rather than the MPRSA. This eliminates the need for a lengthy and formal designation as an official ocean disposal site for each and every receiving beach (memo from Brian Ross to Laura Johnson, April 2000). Hence, the guidelines become the primary criteria used by the USACE and EPA in evaluating beach nourishment projects. If no real need for nourishment can be demonstrated or if most of the material will not serve the intended purpose, the activity would be considered disposal (and thus regulated under MPRSA).

The 404(b)(1) guidelines allow for site-specific determinations regarding compatibility of dredged-sediment grain sizes with receiving beaches. Dredge or fill discharges must satisfy the requirements of sec 230.10 of the guidelines which, among other things, mandate that 1) the discharge site must be the least environmentally damaging alternative, 2) discharge will not result in significant degradation of ecosystems based on factual determinations, and 3) that all practicable means must be employed to minimize for adverse environmental impacts.

The Inland Testing Manual (Manual) was prepared by the USACE and EPA as a guidance document for implementing compliance with the 404(b)(1) Guidelines. It sets out the recommended protocols for three levels of tiered testing of dredged materials. It is necessary to proceed through the tiers only until information sufficient to make factual determinations has been obtained. Subpart G of the 404(b)(1) guidelines requires the use of available information to make a preliminary determination whether additional tiered chemical or biological testing of the material is necessary. Tier 1 emphasizes grain-size compatibility and chemical similarity of the dredged material to the receiving beach. If a first-tier analysis demonstrates grain-size compatibility with the receiving beach, dredged material can often be excluded from second- and third-tier chemical or biological testing. Such situations are most likely when the dredged material is composed primarily of sand, gravel and/or inert materials from a high-energy environment, the sediments are from locations far removed from contaminant sources, or the sediments are from pre-industrial age deposits not exposed to modern pollution sources (40 CFR Sec. 230.60(a), U.S. Code of Federal Regulations, 2003b). Additional

testing is based on the concept of “reason to believe.” If there is a reason to believe that contaminants may be present, further evaluation is required.

From a regulatory standpoint, the physical compatibility of dredged material with the beach is the USACE’s primary basis for its decision regarding whether additional tiered chemical or biological testing is necessary. To make this decision, first-tier analysis of the dredged material grain-size distribution must be first be conducted and compared with the grain-size “envelope” of the receiving beach. When the material is determined to have an incompatibly high fine-sediment fraction, the second- and possibly third-tier chemical and biological testing are required to ascertain the degree of contamination in the fine fraction and the natural resources that might be impacted by the discharge or deposition of the fine-sediment fraction. Only then can the EPA and the USACE decide whether a relatively higher percentage of fines can be approved.

The Los Angeles District of the USACE regulates most California beach replenishment projects. In order to approve the use of dredged material for beach nourishment, the District requires the tiered testing approach as described in the Manual. The District’s tier-one testing is designed to determine if the dredged material is composed predominantly of sand, gravel, rock, or any other material greater than silt size and if the dredged material is compatible with the material on the receiving beach. Specific protocols for number and selection of dredge area and receiving beach sample sites, sampling methods, and data analysis methods are described in the District’s “Requirements for Sampling, Testing, and Data Analysis of Dredged Material Guidelines” (U.S. Army Corps of Engineers, undated; copy is available from CGS). To demonstrate compatibility with a given beach, the Los Angeles District requires that the overall percentage of silt and clay (grains less than 0.074 mm) in the dredged material must not exceed that of the finest beach sample by 10 percentage points. When a definitive determination of compatibility cannot be made, or, the dredged material contains a higher percentage of silt and clay, the tiered testing is then required. Satisfactory second- and third-tier test results may provide the USACE with the factual information from which it could approve using dredged material with 20% or more clay and silt for beach nourishment projects.

80/20 COARSE-TO-FINES “RULE-OF-THUMB” RATIO VARIANCES

Since the 80/20 ratio is an unenforceable rule of thumb, and applies to provisions of the MPRSA rather than the CWA, it becomes a futile exercise to identify beach nourishment projects that were permitted under a variance to this rule. While there may be isolated cases where the ratio was used to approve dredged sediment for replenishment, it is clear that most, if not all, projects that were implemented after enactment of the CWA in 1977 and development of the Inland Testing Manual required testing as required under the 404(b)(1) guidelines. Further, since it is agreed that the 80/20 ratio applied to provisions of the MPRSA, it could not have been applied to projects preceding enactment of the MPRSA in 1972.

In fact, in recent years there have been some beach nourishment projects in California that have been allowed to use dredged material with greater than 20% fines, but only after compatibility testing under the 404(b)(1) guidelines. In no case, however, has material exceeding 50% fines been approved. In one case, Santa Cruz Harbor was approved to use a maximum of 3,000 cubic yards per year of inner harbor material with fines ranging between 20-50%. It should be noted that this represents only 1% of the total material (generally 90%+ sand) placed on the beach every year (Brian Ross, "Beach Nourishment Questions", e-mail to author, June 7, 2004).

Since records indicate that perhaps hundreds of site-specific nourishment episodes have been undertaken in California over the years (some as early as the 1920s), it would be a daunting task requiring many hours of research to identify all projects involving the use of sediments containing more than 20% fines. Consequently, it is considered beyond the scope of this project.

RECOMMENDATIONS

- Research the numerous beach-nourishment project files to identify projects that actually used a higher percentage of fines than 20%. Also research any post-nourishment monitoring of these beaches to determine the fate of the fine-sediment fraction and the long-term effects on beach profiles.

CSMW TASK FIVE

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